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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/591,046

08/29/2006

Hiroki Matsuoka

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EXAMINER

NGUYEN, TU MINH

ART UNIT

PAPER NUMBER

3748

MAIL DATE

DELIVERY MODE

09/18/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/591,046

Applicant(s)

MATSUOKA ET AL.

Examiner

Tu M. Nguyen

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 August 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 20060829.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. An Applicant's Preliminary Amendment filed on August 29, 2006 has been entered.

Claims 1-16 have been amended; and claim 17 has been added. Overall, claims 1-17 are pending in this application.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. **Claims 1-6 and 10-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schaller et al. (U.S. Patent 6,948,311) in view of Tashiro et al. (U.S. Patent 6,622,480).**

Re claims 1 and 16, as shown in Figure 1-3, Schaller et al. disclose an exhaust purifying apparatus and a method for purifying exhaust gas for an internal combustion engine (100), the apparatus comprising:

- an exhaust purifying mechanism (115b) that is located in an exhaust passage (110) of the internal combustion engine, wherein the exhaust purifying mechanism traps particulate matter in exhaust gas;

- a fuel adding device (182) for adding fuel to exhaust gas that passes through the exhaust purifying mechanism;

- a detecting section (192) that detects a pressure difference between a section upstream and a section downstream of the exhaust purifying mechanism (see lines 4-7 of column 7);

- a comparing section (step 270), wherein, while the fuel adding device is adding fuel to exhaust gas, the comparing section monitors the pressure difference that is detected by the detecting section at a predetermined point in time (see line 38 of column 6 to line 7 of column 7); and

- a setting section, wherein, when the comparing section determines that the pressure difference has satisfies a specific requirement, the setting section sets the manner of adding fuel of the fuel adding device to intermittent fuel addition (in the embodiment of Figure 3, even when a retention time has expired (step 270 with a positive answer), the fuel adding device (182) intermittently adds fuel into the exhaust during a third phase to prevent a decrease in temperature during a regeneration of the exhaust gas purifying mechanism (see Figure 3, lines 22-25 of column 7, lines 1-3 of column 8, claim 4)).

Schaller et al., however, fail to specifically disclose that in the setting section, the “specific requirement” means that the pressure difference exceeds a pressure difference reference value.

As shown in Figure 1, Tashiro et al. disclose a diesel particulate filter unit (4) and a regeneration control method for said unit. As illustrated in Figure 8, Tashiro et al. teach that during a regeneration of the filter unit, it is conventional in the art to monitor a pressure difference between an upstream and a downstream location of the filter unit by using sensors (51,

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52) and adjust (in step S33) an injection of fuel into the exhaust gas when the pressure difference is less than or equal to a second pressure difference reference value ($\Delta Pe2$) and is greater than a third pressure difference reference value ($\Delta Pe3$). It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the teaching by Tashiro et al. in the apparatus and method of Schaller et al., since the use thereof would have been routinely practiced by those with ordinary skill in the art to save fuel and to protect a filter from thermal damage during its regeneration.

Re claims 2-3, as taught by Tashiro et al., in the modified apparatus of Schaller et al., the predetermined point in time is a first point in time, and the pressure difference reference value ($\Delta Pe3$) is a first pressure difference reference value, and wherein, after the setting section sets the manner of adding fuel to the intermittent fuel addition (as in Schaller et al.), the comparing section compares (step S35 in Tashiro et al.) the pressure difference that is detected by the detecting section at a second point in time that is different from the first point in time with a second pressure difference reference value ($\Delta Pe4$) that has been set in correspondence with the second point in time, wherein when the pressure difference detected at the second point in time becomes equal to or less than the second pressure difference reference value, the setting section ends the intermittent fuel addition (step S35 has positive answer and step S36).

Re claim 4, in the modified apparatus of Schaller et al., when an estimated accumulation amount of particulate matter in the exhaust purifying mechanism becomes zero after setting the manner of adding fuel to the intermittent fuel addition, the setting section ends the intermittent fuel addition.

Re claim 5, in the modified apparatus of Schaller et al., after setting the manner of adding fuel to the intermittent fuel addition, the setting section sets the fuel addition of the intermittent fuel addition to be performed a predetermined number of times (see lines 43-49 of column 6).

Re claim 6, in the modified apparatus of Schaller et al., as taught by Tashiro et al., the predetermined point in time includes a point in time at which an estimated accumulation amount of particulate matter in the exhaust purifying mechanism becomes equal to or less than a threshold value.

Re claims 10-11, in the modified apparatus of Schaller et al., it is obvious that when an intake air amount of the internal combustion engine is equal to or more than a predetermined amount (i.e., when the engine is in operation with an intake air amount is greater than zero), the detecting section detects the pressure difference between a section upstream and a section downstream of the exhaust purifying mechanism.

Re claim 12, as taught in Figure 6 of Tashiro et al., in the modified apparatus of Schaller et al., the pressure difference reference value is increased as the intake air amount of the internal combustion engine is decreased.

Re claims 13-14, the modified apparatus of Schaller et al. discloses the invention as cited above, however, fails to disclose that the pressure difference includes an average value of pressure differences detected or a value obtained by smoothing pressure differences detected during a period from the point in time until a predetermined time elapses.

It is well known to those with ordinary skill in the art that the pressure difference in Schaller et al. includes an average value of pressure differences detected or a value obtained by smoothing pressure differences detected during a period from the point in time until a

predetermined time elapses. Therefore, such disclosure by Schaller et al. is notoriously well known in the art so as to be proper for official notice.

Re claim 15, in the modified apparatus of Schaller et al., the exhaust purifying mechanism includes an exhaust purification catalyst (115a) through which particulate matter in exhaust gas passes and an exhaust purifying member (115b) that is located downstream of the exhaust purification catalyst and traps the particulate matter, and wherein the detecting section detects a pressure difference between a section upstream and a section downstream of the exhaust purifying member (115b).

4. Claims 7-9 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schaller et al. in view of Tashiro et al. as applied to claim 1 above, and further in view of Christen et al. (U.S. Patent 6,405,528).

Re claims 7-8, the modified apparatus of Schaller et al. discloses the invention as cited above, however, fails to disclose that the apparatus further comprises an estimating section and a correction section, wherein the estimating section estimates the amount of noncombustible matter in the exhaust purifying mechanism based on the pressure difference detected when the intermittent fuel addition is ended, and wherein the correction section corrects the pressure difference detected by the detecting section or the pressure difference reference value based on the amount of noncombustible matter estimated by the estimating section.

As shown in Figures 1 and 3, Christen et al. disclose a method for determining load on a particulate filter unit (16b) for engine exhaust, including estimation of ash content. As indicated on line 15 of column 6 to line 45 of column 7, Christen et al. teach that it is conventional in the art to estimate an amount of noncombustible matter (ash) in the filter unit based on a pressure

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difference detected when a regeneration of the filter unit is ended; and corrects at least one of a pressure difference detected by the detecting section and the pressure difference reference value based on the amount of noncombustible matter. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the teaching by Christen et al. in the modified apparatus of Schaller et al., since the use thereof would have been routinely practiced by those with ordinary skill in the art to accurately determine a regeneration timing for the filter unit.

Re claims 9 and 17, in the modified apparatus of Schaller et al., the estimating section estimates the amount of noncombustible matter based on the pressure difference detected when the preceding intermittent fuel addition was ended and the pressure difference when the current intermittent fuel addition is ended (see lines 55-60 of column 6 in Christen et al.).

Prior Art

5. The IDS (PTO-1449) filed on August 29, 2006 has been considered. An initialized copy is attached hereto.

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure and consists of four patents: Russell (U.S. Patent 6,237,326), Moraal et al. (U.S. Patent 6,304,815), Kuentler et al. (U.S. Patent 6,594,990), and Imai et al. (U.S. Patent 6,952,918) further disclose a state of the art.

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Communication

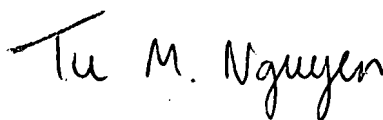
7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (571) 272-4862.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TMN

September 14, 2007



Tu M. Nguyen

Primary Examiner

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